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SCHOOL BUS GARAGES, 1966 REVISION.

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DESCRIPTORS- *BUILDING DESIGN, BUILDING EQUIPMENT, BUS
TRANSPORTATION,

STANDARDS AND RECOMMENDATIONS ARE GIVEN FOR THE DESIGN
AND CONSTRUCTION OF SCHOOL BUS GARAGES INCLUDING BRIEF
DISCUSSIONS OF--(1) SITE DEVELOPMENT, (2) DESIGN AND
CONSTRUCTION, AND (3) MECHANICAL (HEATING, PLUMBING, AND
VENTILATION) AND ELECTRICAL FACTORS. (JT)

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The State Education Department
Albany, New York 12224

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November 1, 1966

To: Architects, Engineers, City, Village and District
Superintendents, Supervising Principals and
Superintendents of Buildings and Grounds

Attached are revised standards and recommendations relating to the construction of school bus garages. This revision has been developed by the Division of Educational Facilities Planning, in cooperation with the State Labor Department. We are of the opinion that it includes desirable safety and health considerations and that its use will provide economical facilities.

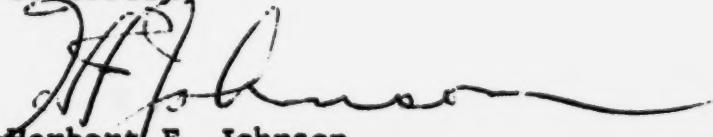
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The safety and health of persons accommodated in the building are of major concern to all of us. Every consideration should be given to these important matters when planning and building a bus garage and storage facility. The actual day to day operation is also extremely important. In this connection we urge school districts to welcome inspections of bus garage facilities by the State Labor Department. An arrangement has been made whereby the Division of Educational Facilities Planning will receive a copy of all reports furnished the district by the Labor Department inspector. Upon receipt of this report, a representative of the Division of Educational Facilities Planning will be in touch with the school district to review, discuss and make recommendations concerning safety conditions. The school district's cooperation will reduce the hazards which presently tend to make the bus garage the highest cost area in respect to Workmens' Compensation Insurance.

The Division of Educational Facilities Planning will be pleased to hear from you when you have problems relating to the planning, construction and operation of school bus garage facilities.

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

Sincerely,


Herbert F. Johnson
ASSOCIATE COMMISSIONER
FOR EDUCATIONAL FINANCE AND
MANAGEMENT SERVICES

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SCHOOL BUS GARAGES

1966 Revision

1. SITE DEVELOPMENT

- A. Construction of school bus garage facilities is recommended to be on a site separate from a school building site or, if on the same site, as remote from a school building as possible.
 - 1. If on the same site, in addition to the above:
 - a. The garage shall not be attached to a school building.
 - b. Bus circulation shall not interfere with safety of pedestrian traffic and access to play areas, or with future building expansion. Bus driveway shall not encircle school buildings.
 - c. Public and staff parking shall not interfere with free movement of buses.
- B. Sites with steep slopes should be avoided. A ten (10) percent slope is the maximum for vehicular traffic.
- C. Paving Materials (such as blacktop and concrete) should provide a hard, dry, non-slippery surface. State and county highway specifications may be used for guidance.
 - 1. Drives generally should be 12 feet wide; 20 feet wide if vehicles pass. Drives should be as short and direct as possible in consideration of initial cost, snow removal and maintenance.
 - 2. Turning circle in front of garage doors should be a minimum of 90 feet diameter; 110 feet diameter is recommended.
 - 3. Lanes and parking areas should be designated with appropriate signs and lines to provide safe and unrestricted bus circulation.
 - 4. Parking area for driver's and mechanic's vehicles should be provided, and at such locations which avoid interference with bus circulation.
- D. Landscaping and planting should not restrict vision along drives nor at intersections, nor should it affect snow removal by being too close to the driveway.
- E. Gas Pump Installations should be in a safe, accessible location, preferably remote from the garage building, and well protected from physical damage. Gasoline storage tanks should not be located under drives.
 - 1. Blacktop paving deteriorates when subjected to spilled gasoline. Concrete or gravel should be considered in such locations.

2. DESIGN AND CONSTRUCTION

A. General: School bus garages should be designed and constructed to properly house the school district's current bus program and to facilitate future expansion and to afford adequate safety to all occupants of the facility. School districts are urged to avail themselves of the inspection services of all New York State agencies with regard to equipping, arranging, operating and maintaining the facility to reasonably and adequately protect the lives, health and safety of all persons using the facility.

1. Tandem stall layout should be considered if there are over seven stalls.
2. Design should consider office space, drivers room, lavatory and toilet facilities for drivers and mechanics, as well as shower facilities for the mechanics. The possibility of women drivers should also be considered.

B. Bus Stalls: Depth of bus stalls should be a minimum of 40 feet clear, inside; 78 feet clear if in tandem.

1. Storage stalls of 12 feet width are generally found to be satisfactory.
2. Repair and wash stalls should be provided.
 - a. Repair stalls should be a minimum of 16 feet wide (to facilitate pulling axles) by 50 feet long.
 - b. Repair stalls should be provided with at least 10 lineal feet of work bench and tool racks.
3. Storage areas for maintenance and repair items should be located convenient to maintenance facilities.

C. Exits: A minimum of two exits, remote from each other, shall be provided from each general area.

1. Distance of travel to an exit shall not exceed 150 feet.
2. Doors at required exits shall swing in the direction of egress and shall be equipped with hardware which is always operable from within the building.
3. Door width at required exits shall be a minimum of 36 inches. A pass(wicket)door in an overhead door may be approved as one of the required exits.
4. Exits shall be unobstructed, with a 36 inch minimum clear passageway width.

D. Walls, Partitions and Roof Construction are recommended to be of fire resistive material; however, serviceable facilities have been built of wood frame construction, pole barn construction and with

wood roof. A detailed economic study considering construction, initial costs, operation costs, maintenance, depreciation, insurance, etc. should indicate a suitable type of construction.

- D. 1. Bus service(repair) areas shall be separated from bus storage areas by two hour fire-rated construction, with self-closing, Class B, fire-rated doors and frames.
- 2. Overhead construction and/or ceilings should be finished with reflective, light colors.

2. DESIGN AND CONSTRUCTION

E. Storage Rooms for flammable materials and heater rooms required by section 3-B-1, shall have walls and floors(and ceilings, if there is usable space above) of at least two hour fire-rated construction, with self-closing, Class B fire-rated interior doors and frames. Duct and grille openings shall be provided with fusible link fire dampers.

- 1. Doors of heater rooms should open directly to the exterior.
- 2. Combined storage and heater rooms are not recommended; however, in no case shall storage occur within four feet of the heating unit burner side, nor within 1'-6" from the other sides of the heating unit.

F. Floor Surface should be hard, dry, non-slippery, nondusting, low in maintenance and properly pitched to drain.

- 1. Concrete floors should be designed to withstand the applied loads and serious consideration should be given to the location of expansion and contraction construction joints. Surfaces shall be treated with curing or sealing compounds to diminish dusting. Painting of concrete floors is seldom necessary.

G. Toilet and Wash Facilities: Separate toilet room shall be provided for each sex with no direct connection or opening between the rooms. A minimum of one lavatory shall be provided in the toilet room for each water closet, unless washing facilities are provided in the work area in proximity to the toilet room(s).

- 1. Construction shall be solid from floor to ceiling, minimum clear height 7'-6" with top ceiled over.
 - a. Walls, ceilings and compartment partitions shall be of non-absorbent material, or finished with light-colored water-repellent paint.
 - b. Floor and base shall be of non-absorbent material. Base shall be 6" minimum height, coved at the bottom.

- c. Doors shall be unglazed, self-closing, with lock or latch, and hung so as to screen the interior from view.
 - d. Water closets shall be enclosed in individual compartments if there are more than one, or if a water closet and one or more urinals.
- H. Dual-post Hydraulic Lift of 10 ton minimum capacity should be provided in a repair stall. Clear height above the lift must be increased over normal roof height - usually 4'-6" +.
1. Grease pits are less desirable than hydraulic lifts and are not common to new bus garage construction. However, if used, a grease pit should be 4 feet in depth, 40 feet minimum in length, 3'-6" minimum in width between side walls, and have both ends rounded. Pits should be protected by a 6 inch high concrete or steel curb around the perimeter, and equipped with adequate remote stairs. Recessed storage facilities should be provided at pit floor level. Pits should also be provided with a drain, or sump and sump pump.
- I. An Overhead Track and chain hoist assembly of one ton minimum capacity should be considered at the repair stall to facilitate pulling motors.
- J. Open-sided Floor Areas more than four feet above the main floor shall have the open sides guarded by 42 inch (minimum) high railings. Permanent stairs or a ladder shall be provided to reach the upper level.
1. Exterior wall door openings four feet or more above grade shall be protected by railings.
2. Stairs shall be guarded on open sides by railings.
3. Stairs shall have non-slip treads.
- K. Overhead Doors are recommended to be a minimum of 12 feet high. An 11 foot width is recommended. Double width doors (20 foot minimum) should also be considered.
1. Overhead doors should be glazed with clear wire glass at eye level.
2. Bumpers or wheel guards at door jambs are desirable, but not essential. Guards at free standing interior columns are essential.
- L. Fire Extinguishers shall be provided, - a minimum of one for each repair stall and one for each four storage stalls, all suitable for Class B and C fires.
1. Extinguishers shall be located remote from each other and in proximity to service area exits and adjacent to high hazard areas.

- M. Spray Painting facilities in a bus garage should generally be restricted to infrequent "touch up" work. Such work does not generally constitute a health hazard and the small amounts of flammable liquid materials stored and used generally do not produce an uncommon fire hazard. The spray operator must, however, use personal respiratory protective equipment of a type specifically designed for paint spraying.

Materials and/or methods which produce dangerous air contamination should be avoided. Large-scale painting operations usually produce dangerous air contamination which must be controlled or removed. Special provisions required to protect health and to provide fire safety result in costly installations. This dictates that ONLY those districts whose bus operation is large enough to warrant the additional costs should consider complete spray painting facilities. Specific requirements for complete spray painting facilities may be obtained from the Division of Educational Facilities Planning.

1. Storage of flammable liquids and application of same shall be in rooms of fire-rated construction as required by section 2.E.
2. Fire extinguishers as required by section 2.L shall be provided at exits of rooms used for storage, and for application of flammable liquids.

- N. Engine Heaters: Enclosed bus storage stalls generally prevent vandalism and theft, eliminate cold motors with associated hard starting and excessive wear, and reduce body deterioration from the corrosive effects of rain, wind, snow and especially, sun. However, engine heaters have been satisfactorily used by some districts in lieu of enclosed bus storage facilities.

1. Engine heaters are generally of two types.
 - a. Electrically operated, thermostatically controlled external type heaters which when connected in series with the engine cooling system, circulate the coolant by gravity through the engine block. Integral pumps are available for positive forced circulation.
 - b. Circulated anti-freeze. A remote reservoir of anti-freeze is heated (by gas or oil) and pumped through a piped system. Branch lines couple to the individual vehicles.

3. MECHANICAL

A. Plumbing:

1. All plumbing work shall be in accord with A.S.A. A.40.7, American Standard Plumbing Code.
2. Toilet and wash facilities shall be provided for drivers and mechanics. See section 2.F.
3. A supply of drinking water shall be provided. Use of drinking fountains is recommended. Use of disposable paper cups, etc. is acceptable. Use of a common cup, etc. is prohibited.
4. Water supply and sewage system shall be approved by the New York State Department of Health.
5. Hot and cold water should be provided at wash stalls, preferably through mixing-type hose bibs.
 - a. Detergent dispensing systems are available for consideration of use.
6. A cold water hose bib should be provided for each two storage stalls.
7. Floor drains should be provided: 1 for each storage stall and each repair stall, 2 for each wash stall. A continuous gutter can be used in lieu of the above.
 - a. Grease traps should be installed in floor drain lines connecting to sanitary or municipal drainage systems.
 - b. Flammable liquids shall be prevented from entering the building drainage system.

3. B. Heating: The heating system should maintain 60 degrees, F., minimum, in repair and toilet areas. Bus storage areas need only to be maintained above freezing. All controls and accessories necessary to insure safe operation shall be included in the system, including all primary controls on a 120 volt, grounded circuit. Installation shall be in accord with requirements of the National Board of Fire Underwriters.

1. Heating units, burning fuel, having an individual or combined rated gross capacity in excess of 250 mbh. and operating at 15 psi. pressure or less shall be enclosed in two-hour construction. See section 2.E. Enclosure of all heating units is recommended.
2. Direct fired unit heaters(space heaters)may be used without enclosures if openings for air in the heater which come in contact with the flame, and the flame proper, are at least 8 feet above the floor.
3. Where the heating system includes a boiler*, the construction, installation, operation and maintenance of such boiler and supplemental equipment shall comply with the provisions of Title 12 of the New York State Official Compilation of Codes, Rules and Regulations, Part 4(12 NYCRR4), to adequately protect the life, health and safety of persons frequenting the facility.

* The term "boiler" as defined by 12 NYCRR4

4. Areas for storage of flammable liquids and for application of same(see section 2-M)shall be heated only by wet system radiation, or indirect forced warm air.

C. Ventilation shall be provided to reduce air contamination to safe levels and to provide an acceptable environment. General ventilation may be by infiltration and gravity exhaust or by mechanical systems where positive circulation is desired.

1. Toilet rooms shall be ventilated. A window opening to the exterior is acceptable at a rate of one square foot of openable area for each water closet. Mechanical ventilation is acceptable at a rate of 35 cfm for each water closet, with positive means of intake air.
2. Motor vehicle fumes shall be exhausted at each servicing location by a duct or 3" minimum diameter flexible pipe, fitting tightly over the tail pipe and/or deflector, which discharges outdoors at a minimum rate of 100 cfm. Total capacity for a system shall be based on the total number of branch ducts; except that, where there are over four branches, and each branch has automatic closing caps, additional capacity may be based on 50% of the number of branches over four.

- a. Where there are no more than four servicing locations, a gas tight duct or flexible pipe of a diameter at least equal to the tail pipe, fitting tightly over the tail pipe, may be used providing the duct length shall not exceed 20 feet to termination outside.
3. Welding, flame cutting, etc. shall be provided with local exhaust ventilation to maintain at least 50 fpm. velocity in the breathing zone of the operator, or 100 fpm. air flow at the welding arc, etc. toward a fixed or movable hood which discharges outside.
 - a. Proper goggles or shields must be worn when performing the above operations.

3. D. Electric:

1. All electric work shall be in accord with the National Electric Code.
2. Electric service should be 220 volt with a minimum 100 amp entrance switch. Three phase service should be considered if available.
3. Permanent electric installations four feet or less above the floor shall be explosion proof. Installations above 4 feet need not be explosion proof, except as below.
 - a. Electric wiring and equipment in rooms used for storage of flammable liquids, and within 20 feet of work areas used for the application of same, shall be in sealed, rigid metal conduit with explosion proof fittings.
 - b. Electric lighting in storage rooms and work areas as in 3.a. above, shall be totally enclosed types and protected against breakage. Lamp sockets shall be non-metallic and of the switchless type.
 - c. Switches, other than explosion proof type, shall be at least 20 feet from work areas for the application of flammable liquids and outside storage rooms for same.
4. A duplex outlet should be provided for each repair stall; for each two bus storage stalls.
5. Flexible electric cords shall be three conductor, extra heavy service type, insulated and grounded.
6. Lighting should be provided to illuminate all areas during working hours.
 - a. Lighting in bus storage areas should be over the aisles between buses.

- b. Properly placed lighting in service areas, (such as industrial type fluorescents) will be advantageous; however, supplemental portable lighting will be necessary. Portable lighting shall be protected from breakage.
 - c. Exterior flood lighting to discourage vandalism should be considered.
7. Exit lights shall be installed at all required exit doors. Exit lights should be on a separate circuit energized on the service side of the main distribution panel.